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ABSTRACT OF THE DISCLOSURE

A new class of superconducting compositions, and methods for making and using them are described. These compositions exhibit superconductivity at temperatures in excess of 26°K. and are comprised of transition metal oxides having at least one additional element therein which may create a multivalent state of the transition metal oxide. The composition can be a ceramic-like material having a layer-like crystalline structure, where the structure is distorted having either an oxygen excess or deficiency. An example is RE-AE-TM-O, where RE is a rare earth or rare earth-like element, AE is an alkaline earth element, TM is a transition metal element (such as Cu) and O is oxygen.